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Title: Bowler's Positive Control System And Method  
Assistant Commissioner of Patents  
Washington, D.C. 20231

This Application has been made special under 37 CFR 102(c) for advancement of examination

### Reply

I. The Reply Brief is limited to rebuttal of examiner's Answer, Claim Rejection 35 USC § 102 and §103. The rejection under 35 USC §101 and §112, is not sustained.

Shaffer. Pat. No. 4,371,163, is included with this Reply as evidence in rebuttal to the first introduction of the article, "The First Instrumented Bowling Ball."

### II. Reply to Claims - Rejection 102

#### A. Principals of Law

The legal principals of claim interpretation and inherency, are stated in Board of Patent Appeals and Interferences (BPAI) Appeal No.2006-3338, decided February 28<sup>th</sup>, 2007, in re. Application 09/396,530.<sup>1</sup>

#### 1. Claim interpretation

As stated in BPAI Appeal No. 2006-3338, at 5,  
[O]ffice personnel must rely on Appellant's disclosure to properly determine the meaning of terms used in the claim *Markman v. Westview Instruments, Inc.* 52 F. 3d 967, 980 (Fed. Cir.

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<sup>1</sup>This decision predates the Answer, mailed 09/13/2007.

1995)

## 2. Inherency

[T]o establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and it would be so recognized by persons of ordinary skill; Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. *In re Robertson* 169 F.3d 743, 745 (Fed. Cir.

### B. Brief Summary Of The Invention

The invention, as disclosed in the Specification Paragraphs [0026] and [0027, comprises

matching or interlocking surfaces in the area of contact made by the interior surface of a bowling ball finger hole and finger pad cover mounted on a bowler's middle finger pad, for achieving positive control when used in releasing the ball and imparting lift to the ball on its release.

[See 0025]

Referring to FIG. 1, the invention description, as disclosed in the specification, shows a bowling ball 10, in partial view, with a finger hole insert 11 when inserted into finger hole 12 and with the insert 11 shown partially in phantom. As would be understood by those skilled in the art, the disclosed invention and the inventive principles may be used in a preferred embodiment with a finger hole insert 11 or may be applied directly on the interior surface of the finger hole 12. The finger hole, or finger hole insert inner surface 14, as shown includes a three dimensional surface. shown generally by numeral 15 on insert inner surface 14, and with base 16 and side walls 18a and 18b, defining a groove disposed parallel to a matching primary axis 22, extending longitudinally through the insert 11, as shown in FIG. 2. In a preferred

embodiment, the three dimensional surface 15, is a groove, extending along an axis 22 extending from the annular opening 19 of the finger hole insert 11, to its bottom 21 and in a direct line with the matching primary axis 22. For the purposes of explanation, axis 22 is identified at the matching primary axis, and is related to the primary axis 37 of the finger pad cover 31, extending from the end adjacent or opposed to the finger tip in a direct line to the end opposed or adjacent to the finger joint, as shown in FIG. 3b.

[See 0026]

## C. The Differences Between The Claims and the Disclosure of Calentine <sup>2</sup>

### a. Claim 1

1. Calentine does not show the claim 1 recitation of a first means for mounting an interlocking three dimensional surface on a finger pad.<sup>3</sup> Calentine is limited to a device for protecting a part of the thumb between the first and second joints, and does not show or disclose any kind of surface on a finger pad, by the element **28** of Calentine or any other element .<sup>4</sup> Because there is no “first means as recited in claim 1, there can be no co-acting of said recited first

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<sup>2</sup> Anticipation under 35 USC 102, is a question of fact, is left to the fact finder, from its examination of Calentine and comparison to the recitation of the claims. [No citations].

<sup>3</sup> As may be seen from Calentine and The First Instrumental Bowling Ball, cited in the Answer, and Shaffer, U.S. Pat. No. 4,371,163, in bowling, the fingers and thumb are identified with separate with respective and distinct uses, placements, and functions.

<sup>4</sup> See fn. 2, above. As Calentine describes his device, the thumb piece 10, is placed on the upper left back of the thumb, from a position back of the first joint to the second joint. As shown in Figs. 6, 4, and 1, the alignment of the thumb piece 10 is with thumb piece back of the thumb first joint, to align the friction insert **28**, 30 (30 shown incorrectly as 24, in Fig 6) with the friction material 72, positioned on the side of the insert 14 in slot 70. The unprotected bare thumb pad, shown in contact with the ball finger hole insert in Fig. 6 (see col. 3, lines 49- 64, col.5, lines 64 - end and col.6, lines 1-3), is not in a position for use in the release of the ball. As described by Calentine, any control of the ball is by the back of the thumb and inserts **28**, 30, as the thumb is withdrawn. See Col. 5, lines 57 -68, Col. 6, lines 1-4.

means and said second means.

Applicant cites Shaffer, Patent No. 4,371,163, in rebuttal to examiner's first appearance of "The First Instrumental Bowling Ball," cited for the first time in this case in the Answer.

Shaffer (attached to the Reply describes the method applying spin to the bowling ball, as follows.

The method of using our invention will become apparent upon consideration of the general problems which it was designed to solve. First, the ball must be made to rotate in a forward and downward direction, i.e., along an axis which is horizontal and perpendicular to the direction of motion. This rotation, shown in FIG. 4, causes the ball to roll in the desired direction down the alley. Secondly, the ball should have a component of rotation (called "spin") along a vertical axis, counterclockwise as viewed from above (if thrown with the right hand). This "spin", shown in FIG. 5, is largely responsible for achieving a desired scattering of the pins as they fall.

Many students of the **bowling** art have recognized that the middle two fingers, which occupy adjacent holes in the ball, should be the source of the desired roll. These fingers should rotate the underside of the ball upward, an effect called "lift", as they leave the ball upon release. In order for this to occur in a smooth manner the bowler's thumb must come out of the ball first. But at the same time the hand should be turning the ball to impart spin. Bowlers commonly have had great difficulty in smoothly accomplishing these aims.

In approaching the release of the ball, the bowler's thumb should be maintained in a higher position than the middle fingers. The best position for the ball is therefore not directly below the hand, but partly beside it and to the inside (as in FIG. 5). The value of supporting the wrist can be seen by comparing FIG. 6 to FIG. 7, in which the wrist is bent backward by the weight

of the ball. But a straight wrist is not enough. Our studies have shown that if the index finger is permitted to bend backward near the moment of release, the thumb cannot be extracted from the ball most efficiently, and moreover the hand lacks sufficient control to impart spin to the ball.

The solution which our invention makes possible is to control simultaneously both the straightness of the wrist and the angle of the index finger with respect to the hand. The supported index finger is thus enabled to partially support and balance the ball. Equally importantly, it acts as a fulcrum. The ball can be tilted easily at the desired moment off the index finger and onto the middle fingers thereby automatically both extracting the thumb and giving spin to the ball.

(See Shaffer, Col. 3, line 34 -end and Col. 4, lines 1 - 17)

Calentine, the reference "The First Instrumental Bowling Ball," cited for the first time, in the Answer, and Shaffer, agree that the thumb comes out of the ball first and the fingers last.<sup>5</sup> Calentine states the purpose of the thumb piece 10, inserts 28, 30 and the insert 14 frictional material, is to slow the sliding of the thumb from the ball giving the fingers extra lifting power and control by the back of the thumb as the thumb is withdrawn from the hole. (See Calentine, Col. 2, lines 42-53, Col. 5, lines 54 - 64).

2, There is no disclosure in Calentine for any kind of surface or covering on any of the finger pads or on the thumb pad, shown as disclosing a "surface on a finger pad.". As shown in Calentine, the thumb is described as separate and apart from the fingers (see for example Col.

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<sup>5</sup> See Calentine, Col. 2, lines 43 -44. See The First Instrumented Bowling Ball, shows three (3) methods of release, a straight shot, a conventional hook shot, and a finger tip hook shot (See Fig. 4, description). While it is difficult to read the poor copy provided to applicant, it appears the thumb is removed from the ball, before the fingers are removed with the last forces applied to the ball exclusively by the middle and ring finger. See also the except from Shaffer, above, and fn. 2.

2. lines 39 -58). The thumb pad is shown unprotected, without any surface covering the thumb pad, and in contact with the ball insert. Numeral 34 shows a cut out displaced from the thumb pad, leaving the thumb pad bare and in contact with the bowling ball insert. (see Figs. 4, 6 and 8) (see Col. 3, lines 59 -63).

3. There is no means in Calentine for the recited interlocking three dimensional surface in the finger hole of the bowling ball. Calentine is limited to a frictional material 72 in slot 70. The purpose of frictional material 72 is disclosed as cooperating with frictional inserts 28, 30, to provide effective friction action during release of the ball. Nothing is disclosed in Calentine, as "interlocking." (See Col. 5, lines 29-39).

4. There is no recited "first means and second means to co-act . . .," (see paragraphs 1 to 3, above).

b. Claims 2 and 3 are dependent from claim 1.

1. Calentine does not show expressly or inherently, a counter force at an angle to the primary or primary matching, axis. The counter force in Calentine is produced by the contact of the friction insert. 24, 28, 30, with the frictional material 72, in response to the removal of the thumb from the ball hole sleeve 14. The thumb removal out of the insert 14 would be parallel to or along, the axis of the sleeve 14. A counter force produced by the contact of friction insert 28, 30 with frictional material 72, would be parallel to, and in the opposite direction to the direction of the thumb as it is removed. The parallel force is not a force as claimed, ". . .at an angle or orthogonal angle, to the primary or matching primary, axis."

c. Claim 5.

1. Claim 5 is dependent from claim 1. Inelastic is described in the specification, Paragraph 0039, lines 6-12. There is no disclosure in Calentine of a substantially inelastic contact area

between the finger tip and finger hole.

d. Claims 6 and 7

1. The claim 6 recitation of an elongated stud and groove for interlocking with said stud, is not met by the friction insert 28 on the thumb piece 10, or by the insert 14, slot **70** used to hold the frictional material 72. Col 3, lines 29 -35, As described, there is no disclosure of any interlocking of slot **70** and the frictional material **28** or 30. (See paragraph A. 3, above) The slot **70** is not disclosed as a hemisphere indentation as it is filled with the protruding frictional material 72.

2. There is no “interlocking,” in Calentine as recited in claim 7. Calentine discloses a frictional material 72, and friction insert 24, 28, 30, is disclosed as used to slow the removal of the thumb. In Calentine the frictional pieces are rubbing against each other, when placed in contact but are not interlocked in any one relative position.

e. Claims 8 to 13, reciting *inter alia*, a finger pad cover, a three dimensional surface with an interlocking pattern, and finger hole or finger hole insert with a matching interlocking pattern, is not disclosed by Calentine, on the facts and reasons given for claims 1 to 7.

As discussed in part, with reference to the discussion for claims 1 to 7, and in rebuttal to the Answer, claims 8 to 13,

- i. Calentine’s thumb device 10, does not cover or protect a finger pad,
- ii. the friction inserts **24**, 28, 30, are not disclosed in an interlocking pattern,
- iii. the frictional material 72 is not disclosed as interlocking with the friction inserts 24, 28, 30, .
- iv. the material used in the Calentin thumb piece 10 is not related to, and does not disclose, an inelastic material for the finger pad cover,
- v. the friction insert 24 is not a stud, whether as disclosed or considered broadly, beyond the

scope of the disclosure.<sup>6</sup> Calentine's refers to the friction insert **28**, as designed to cooperate with the frictional material 72 in slot **70**. There is no groove shown in insert 14, fitting into, or interlocking with frictional material 24, 28, 30.

vi. the slot **70** in insert 14, as disclosed in Calentine, is filled with an frictional material 72, and is not a hemisphere indentation or groove. The slot **70** does not cooperate with any part of the thumb piece 10. It is the frictional material 72 that fills the slot **70**, that cooperates with the friction insert **28**. Te interpretation given in the Answer is not justified or supported by the facts of the Calentine disclosure,

vii. there is no ground given in the Answer for the rejection of claim 13.

f. Claims 14 to 20, reciting, *inter alia*, an aligning interlocking system mounted on the finger pad and in the bowling ball finger hole or insert, is not shown or described in Calentine, for the reasons given for claim 1 to 13 and for the following grounds,

i. **34** is a notch in the device 10. It is not disclosed as covering or protecting the thumb pad or a finger pad. Its purpose is to allow contact of the bare thumb part between the first and second joint with the ball finger hole, see col. 3, lines 59 -83, and does not align the thumb with the ball, as there is nothing in the Calentine thumb piece 10 to prevent the bowler from changing the position of the thumb in the ball finger hole insert 14,

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<sup>6</sup> See the Specification, Paragraph [0030]

FIGS. 3a, 3b, and 3c, shows in a preferred embodiment, the mating or coacting or cooperative interlocking surfaces in the finger hole insert 11 and on the finger pad cover 31. The finger pad cover 31 is shown generally in FIGS. 3a and 3b, as having a tip 33, a contact surface shown generally by 35, a primary axis 37, and a three dimensional surface shown in a preferred embodiment with a protrusion shown as a stud 39. In the preferred embodiment disclosed in FIGS. 3a and 3b, the three dimensional surface 39 is a stud which fits into, or interlocks with, a matching three dimensional groove surface 15 of the finger hole insert 11, as shown in FIG. 3c.



ii. **44** is strap for securing the thumb piece 10 on the thumb between the first and second joint and contains no disclosure of any mounting on the finger pad.

iii. there is no Calentine disclosed interlocking parts on a finger pad and the finger hole,

iv. there is no means for protecting the tip of the bowler's finger from the force of the ball at its release and for transferring substantially all of the accelerating force from the bowler's finger tip to the ball,

v. Calentine's slot **70** is not a groove and there is not groove or stud, shown in Calentine,

vi. there is no ground given for the rejection of claims 17 or 20,

v. slot **70** does not disclose a hemisphere indentation (see Section d, above)

g. Claims 21 to 28 recite a method of using interlocking surfaces on a bowler's finger pad cover and on the surface of a ball finger hole insert to produce a force to counteract shifting of the ball relative to the bowler's finger.

The Answer relies on the disclosed notch **34** (see Section f I, above) and the forces examiner's Answer describes as ". . . inherent, as discussed by the article "The First Instrumented Bowling Ball."

Applicant refers to the recitations of claims 21 to 22 and 24 to 26, which cannot be shown to be disclosed by Calentine, or inherently by the reference article. The Answer must state more than a conclusion that any of the claim recitations are shown by the Calentine or the article, expressly or inherently, disclosed. (See Section II. 2., above)

h. Claims 29 to 33, recite a system of interacting surfaces for controlling the alignment of a bowler's finger with a bowling ball.

1. For claim 29, the answer relies on Calentine, in particular the thumb piece 10, for disclosure of "second means for mounting on a finger pad." The thumb piece 10 does not meet the recitation of claim 28, for the grounds given for claims 1, (see C. a, e, f, above). The disclosure of Calentine does not show a means for mounting on a finger pad, as recited in

claim 29.

2. The Answer relying on the thumb piece 10, does not show the recited finger pad, and cannot form a contact area with the ball insert. Fig. 6, shows the thumb pad, bare and unprotected in contact with the ball thumb hole insert.

#### D. Summary

The Answer relies on elements which are not shown or disclosed in Calentine.<sup>7</sup>

1. **34** in Fig. 6, does not disclose a finger pad.
2. Frictional insert **28** is not mounted on a finger pad or a thumb pad.
3. Frictional material 72 is not an interlocking element, with **24**, 28, or 30, or a groove.
4. The forces shown in the article "First Instrumented Bowling Ball," do not inherently disclose the recited counter force.
5. **70**, shown and described as a slot, is not a hemisphere indentation.
6. Strap **44**, holds the Calentine thumb piece in place but has not function or placement for or on a finger pad, or thumb pad.
7. The article "First Instrumented Bowling Ball," is limited to a description of forces measured from the middle finger, the ring finger, and the thumb, in the release of the ball. The Answer does not show elements required by the claim recitations, by extrinsic evidence and as more than possibilities or probabilities.

#### III. Reply to Claim Rejections -35 USC §103

##### 1. Legal Obviousness

The leading case law on 35 U.S.C. 103 Obviousness, is in **KSR INTERNATIONAL CO., PETITIONER v TELEFLEX INC. ET AL.** No. 04-1350. Supreme Court of United States. Argued November 28, 2006. Decided April 30, 2007.

The issue before the Court, was the rejection under 35 U.S.C. 103, of claimed invention, recited in Claim 4, as,

A vehicle control pedal apparatus comprising:

- a support adapted to be mounted to a vehicle structure;

- an adjustable pedal assembly having a pedal arm moveable in for[e] and aft directions with respect to said support;

- a pivot for pivotally supporting said adjustable pedal assembly with respect to said support and defining a pivot axis; and

- an electronic control attached to said support for controlling a vehicle system;

said apparatus characterized by said electronic control being responsive to said pivot for providing a signal that corresponds to pedal arm position as said pedal arm pivots about said pivot axis between rest and applied positions wherein the position of said pivot remains constant while said pedal arm moves in fore and aft directions with respect to said pivot.

In the Court's view and statement,

The problem addressed by the invention was an improved electronic sensor for sensing the position of aa mechanical foot pedal by an electrical signal produced by a mechanical electrical transducer, mechanically connected to the foot pedal. In the 1990's it became more common to install computers in cars to control engine operation. Computer-controlled throttles open and close valves in response to electronic signals, not through force transferred from the foot pedal by a mechanical link.

For a computer-controlled throttle to respond to a driver's operation operation of the car, the computer must know what is happening with the pedal and an electronic sensor is necessary to translate the mechanical operation of the foot pedal, into digital data the computer can understand. At 5.

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<sup>7</sup> See fn. 2

The prior art patents cited were Redding and Smith. Redding provided an example of an adjustable pedal and Smith explained how to mount a sensor on a pedal's support structure, and the rejected patent claim merely put these two teachings together. Claim 4 was allowed as non obvious by the examiner, because it included the limitation of a fixed pivot point, which distinguished the design from Redding's. At 8. [See underlined claim recitation above]

The factors defining the inquiry of "obviousness," are set out in *Graham v. John Deere Co. of Kansas City*, 383 U. S. 1, 17-18, as an out an objective analysis for applying '103: "[T]he scope and content of the prior art are . . . determined; differences between the prior art and the claims at issue are . . . ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." While the sequence of these questions might be reordered in any particular case, the factors define the controlling inquiry. At 2.

As a set of guiding principles in applying the Graham test, the Court set out the following, at 3,

1. A Combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. See, e.g., *United States v. Adams*, 383 U. S. 39, 50-52.

2. When a work is available in one field, design incentives and other market forces can prompt variations of it, either in the same field or in another.

3. If a person of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, '103 likely bars its patentability.

4. Moreover, if a technique has been used to improve one device, and a person of

ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill. 5. A court must ask whether the improvement is more than the predictable use of prior-art elements according to their established functions. Following these principles may be difficult if the claimed subject matter involves more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement.

5. To determine whether there was an apparent reason to combine the known elements in the way a patent claims, it will often be necessary to look to interrelated teachings of multiple patents; to the effects of demands known to the design community or present in the marketplace; and to the background knowledge possessed by a person having ordinary skill in the art.

6. To facilitate review, this analysis should be made explicit. But it need not seek out precise teachings directed to the challenged claim's specific subject matter, for a court can consider the inferences and creative steps a person of ordinary skill in the art would employ.

The Court addressing combination patents, stated, at 10,

Court has held that a "patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men." *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U. S. 147, 152 (1950). This is a principal reason for declining to allow patents for what is obvious. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. Three cases decided after *Graham* illustrate the application of this doctrine.

In *United States v. Adams*, 383 U. S. 39, 40 (1966), a companion case to *Graham*, the Court considered the obviousness of a "wet battery" that

varied from prior designs in two ways: It contained water, rather than the acids conventionally employed in storage batteries; and its electrodes were magnesium and cuprous chloride, rather than zinc and silver chloride. The Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result. 383 U. S., at 50-51. It nevertheless rejected the Government's claim that Adams's battery was obvious. The Court relied upon the corollary principle that when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious. *Id.*, at 51-52. When Adams designed his battery, the prior art warned that risks were involved in using the types of electrodes he employed. The fact that the elements worked together in an unexpected and fruitful manner supported the conclusion that Adams's design was not obvious to those skilled in the art.

In *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U. S. 57 (1969), the Court elaborated on this approach. The subject matter of the patent before the Court was a device combining two pre-existing elements: a radiant-heat burner and a paving machine. The device, the Court concluded, did not create some new synergy: The radiant-heat burner functioned just as a burner was expected to function; and the paving machine did the same. The two in combination did no more than they would in separate, sequential operation. *Id.*, at 60-62. In those circumstances, "while the combination of old elements performed a useful function, it added nothing to the nature and quality of the radiant-heat burner already patented," and the patent failed under '103. *Id.*, at 62 (footnote omitted).

Finally, in *Sakraida v. AG Pro, Inc.*, 425 U. S. 273 (1976), the Court derived from the

precedents the conclusion that when a patent "simply arranges old elements with each performing the same function it had been known to perform" and yields no more than one would expect from such an arrangement, the combination is obvious. *Id.*, at 282.

The Court's analysis addressed,

[T]he principles underlying these cases [as] instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, '103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida and Anderson's-Black Rock* are illustrative. A court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

The Court of Customs and Patent Appeals captured a helpful insight when it first established the requirement of demonstrating a teaching, suggestion, or motivation to combine known elements in order to show that the combination is obvious. Referring to *Application of Bergel*, 292 F. 2d 955, 956-957 (1961), the Court stated, at 11,

As is clear from cases such as *Adams*, a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be

combinations of what, in some sense, is already known.

In any analysis of "obviousness," the Court cautioned, at 11,

. . . Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

In addressing the analysis of the Court or Appeals in the case sub judice, the Court identified that Court's errors, as follows.

The first error of the Court of Appeals in this case was to foreclose this reasoning by holding that courts and patent examiners should look only to the problem the patentee was trying to solve. 119 Fed. Appx., at 288. The Court of Appeals failed to recognize that the problem motivating the patentee may be only one of many addressed by the patent's subject matter. The question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art. Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

The second error of the Court of Appeals lay in its assumption that a person of ordinary skill attempting to solve a problem will be led only to those elements



of prior art designed to solve the same problem. Ibid. The primary purpose of Asano was solving the constant ratio problem; so, the court concluded, an inventor considering how to put a sensor on an adjustable pedal would have no reason to consider putting it on the Asano pedal. Ibid. Common sense teaches, however, that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. Regardless of Asano's primary purpose, the design provided an obvious example of an adjustable pedal with a fixed pivot point; and the prior art was replete with patents indicating that a fixed pivot point was an ideal mount for a sensor. The idea that a designer hoping to make an adjustable electronic pedal would ignore Asano because Asano was designed to solve the constant ratio problem makes little sense. A person of ordinary skill is also a person of ordinary creativity, not an automaton.

The same constricted analysis led the Court of Appeals to conclude, in error, that a patent claim cannot be proved obvious merely by showing that the combination of elements was "obvious to try." *Id.*, at 289 (internal quotation marks omitted). When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under '103.

The Court of Appeals, finally, drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. A fact finder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning. See *Graham*, 383 U. S., at 36 (warning against a "temptation to read into the prior art the teachings of

the invention in issue" and instructing courts to "'guard against slipping into the use of hindsight'" (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F. 2d 406, 412 (CA6 1964))). Rigid preventative rules that deny fact finders recourse to common sense, however, are neither necessary under our case law nor consistent with it.

The Court, finding the District Court was correct to conclude that, as of the time the invention was reduced to practice, and as recited in the allowed claim 4, there then existed a marketplace that created a strong incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for achieving this advance. At 13.

The Court, starting with a market place needs analysis, saw as the proper question to have asked was ,

whether a pedal designer of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, would have seen a benefit to upgrading [the Asano patent], with a sensor.

At 14.

The Court's finding, in its response to its question, put rhetorically, was a "wide range of needs created by developments in the field of endeavor" using the existing prior art facts, that,

- a) the '936 patent taught the utility of putting the sensor on the pedal device, not in the engine.
- b) Smith, in turn, explained to put the sensor not on the pedal's footpad but instead on its support structure.
- c) from the known wire-chafing problems of Rixon, and Smith's teaching that "the pedal assemblies must not precipitate any motion in the connecting wires," the designer would know to place the sensor on a non moving part of the pedal structure.

and

- d) the most obvious nonmoving point on the structure from which a sensor can easily detect

the pedal's position is a pivot point.

At 14.

The Court, based on its fact finding, concluded that a designer, accordingly, would follow the teaching of Smith that the pedal assemblies must not precipitate any [translational] motion in the connecting wire and in mount the sensor on the pivot, [stationary relative to translational movement]. thereby designing an adjustable electronic pedal covered by claim 4.

Using the market needs analysis, the Court found a designer, following similar steps to those just explained, would learn from Smith to avoid sensor movement and would come, thereby, to Asano because Asano disclosed an adjustable pedal with a fixed pivot.

The prior art discussed above leads us to the conclusion that attaching the sensor where both KSR and Engelgau put it would have been obvious to a person of ordinary skill.

Applying 35 U.S.C. 103, to the instant invention, the errors identified as made by the Court of Appeals, are considered in view of the Graham test. In summary, the errors (see above), are,

- a) that the courts and patent examiners should look only to the problem the patentee was trying to solve.
- b) that a person of ordinary skill attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem.
- c) that a patent claim cannot be proved obvious merely by showing that the combination of elements was "obvious to try."
- d) that the risk of courts and patent examiners falling prey to hindsight bias, required

rigid preventative rules, neither necessary under our case law nor consistent with it, that deny fact finders recourse to common sense.

A summary of the Courts analysis, is,

- a. a requirement in the case of a combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does;
- b. when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious;
- c. secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

2. Claims 5, 13, 17, 20, 27, 31, have not been shown as obvious.

- a. Calentine does not disclose the elements recited in these claims, as shown above in the reply and rebuttal to the rejection under 35 USC §102, for example without limitation, by elements, 10, 24, 28, 30, 34, 44, 70, 72. For example, Calentine frictional insert whether 24 or 28, is not a “stud, indentation 70 is not a groove and 70 does not interact with the frictional inserts 24, 28, 30.
- b. There is no identification any thumb or finger, tip protection in Calentine.
- c. Calentine teaches away from protecting the thumb pad or tip, or that protection is needed, disclosing the preference for leaving the thumb pad and tip bare. (See Calentine, col. 4, lines 59 - 63 and Fig. 6).
- d. The Answer does not facilitate review by being made explicit, by inferences or steps, a person of ordinary skill in the art would employ in constructing the claimed combination. Instead, the Answer relies on statements as conclusions, stating “it

would be obvious,” “ ”such is a matter of common sense,” or “common knowledge,” “skill in the art is presumed,” and “one must observe that an artisan must be presumed to know something about the art apart from what the references disclose.”<sup>8</sup>

#### IV. Answer - Response to applicant’s arguments

Examiner had placed a heavy burden on applicant by the rejections under 35 USC 101 and 35 USC §112, included with the rejections under 35 USC §102 and §103. Examiner has forced applicant to respond to the 35 USC §101 and 35 USC §112, rejections, causing examiner, in conference, to withdraw these rejections as not sustained.

Examiner has forced applicant to appeal the Final 35 USC §103 and 35 USC §103, rejections. In response, the Answer, removed and replaces the ground of rejection, given in the Final rejection.

Similarly, applicant has responded in good faith to the full sum and content of the Answer’s rejection under 35 USC §102 and 35 USC §103, based on Calentine. Applicant has met the burden under 35 USC 102, by its Appeal Brief, stating what Calentine disclosed (see Appeal Brief, page 20) and identifying specific parts of the recited claims, not disclosed in Calentine, as anticipated under 35 USC §102.

Applicant has met its burden of going forward with a rebuttal to each of the grounds of

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<sup>8</sup> These statements concerning what an artisan is presumed to know apart from the references, may be found in **KSR INTERNATIONAL CO., PETITIONER v TELEFLEX INC. ET AL.** However, the Answer does not show what an artisan is presumed to know, unlike KSR International where a prior art patent of Arsano was in evidence and from that evidence, the Court found what an artisan would learn or know from the Arsano evidence.

rejection given in the Final action. The facts and reasons, presented in the Appeal Brief, placed the burden on examiner to respond to applicant with facts and reasons why the rejections under 35 USC §101, 35 USC §112, 35 USC §102 and 35 USC §103, should be vacated.

Respectfully submitted,

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Enclosure: Shatter, Patent No. 4,371,163.

[54] **BOWLER'S WRIST AND FINGER CONTROL DEVICE**

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[22] Filed: Nov. 26, 1980

[51] Int. Cl.<sup>3</sup> ..... A63B 69/00

[52] U.S. Cl. .... 273/54 B; 2/161 A

[58] Field of Search ..... 273/54 B, 189 A;  
128/77, 87 R, 87 A, 89 R; 2/161 A

[56] References Cited

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3,467,379 9/1969 Kistner ..... 273/54 B  
3,788,307 1/1974 Kistner ..... 128/77

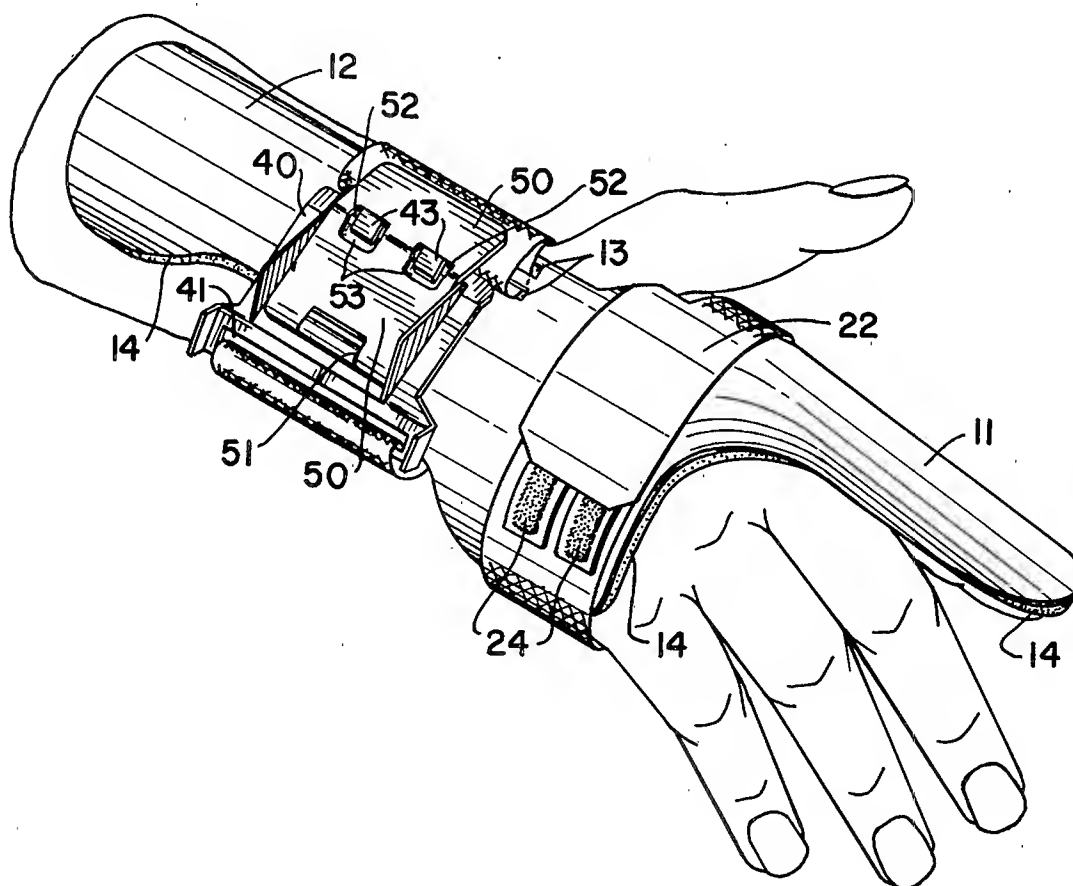
4,176,840 12/1979 Lanning ..... 273/54 B  
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Primary Examiner—Anton O. Oechsle  
Attorney, Agent, or Firm—Woodling, Krost & Rust

## [57] ABSTRACT

A bowler's wrist and forefinger support which comprises a rigid body adapted to extend dorsally from the forefinger to a location on the forearm above the wrist. The distal portion of the support extends over and partially encases the forefinger throughout its entire length. The proximal portion is cylindrically curved to fit generally around the back of the hand, wrist and forearm. The support restricts backward movement of the forefinger to an optimal angular range of 15 to 20 degrees forward with respect to the axis of the hand.

1 Claim, 7 Drawing Figures



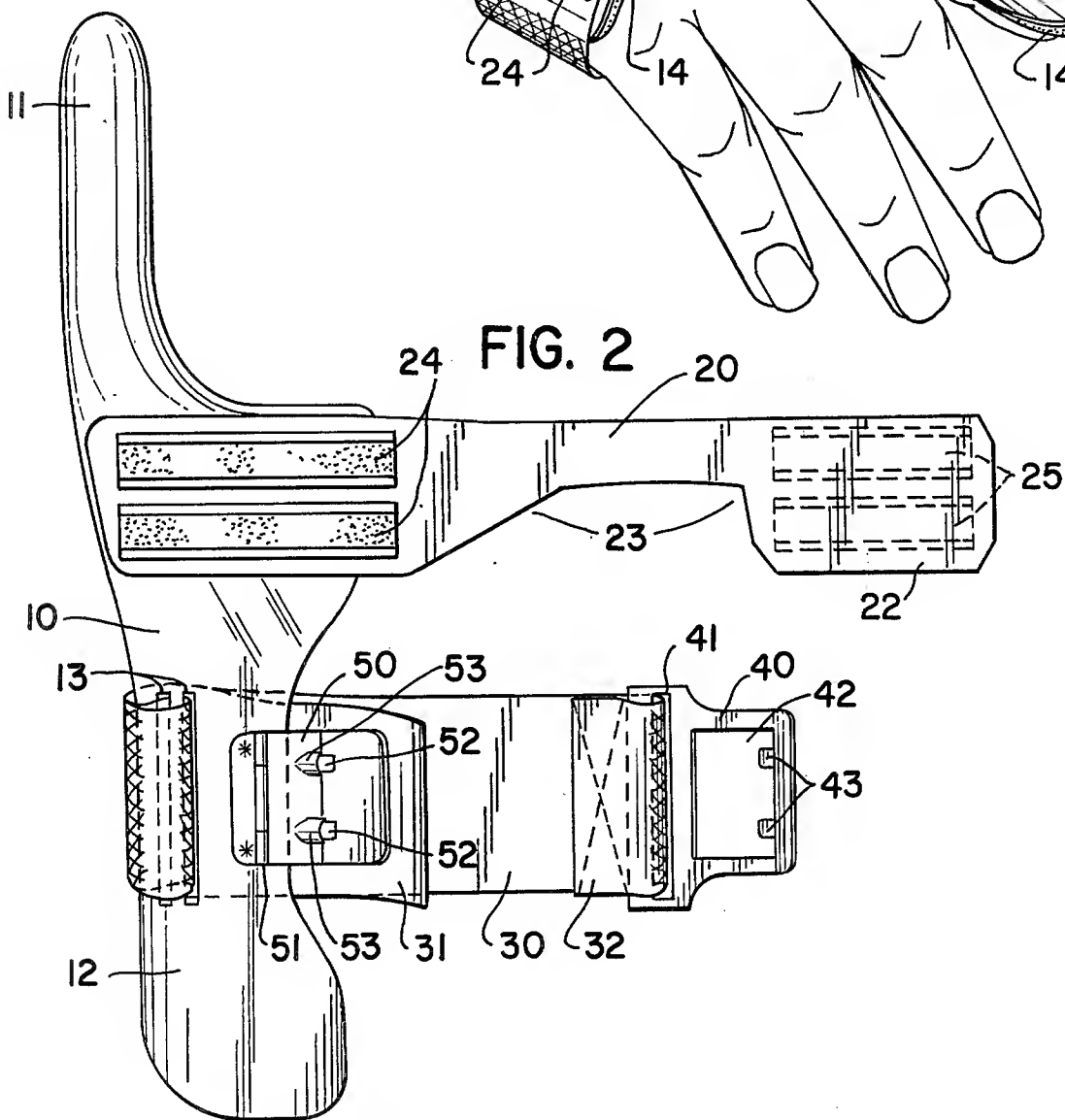
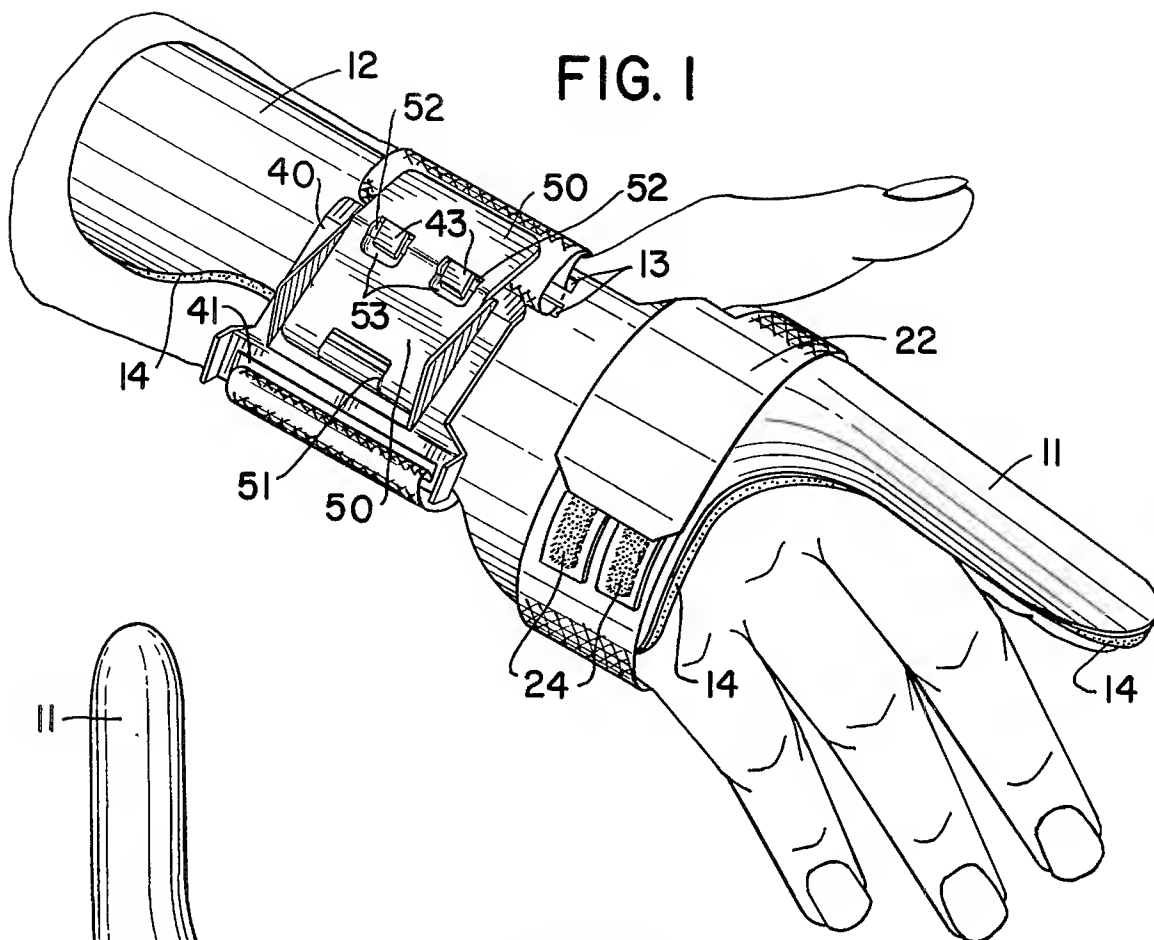
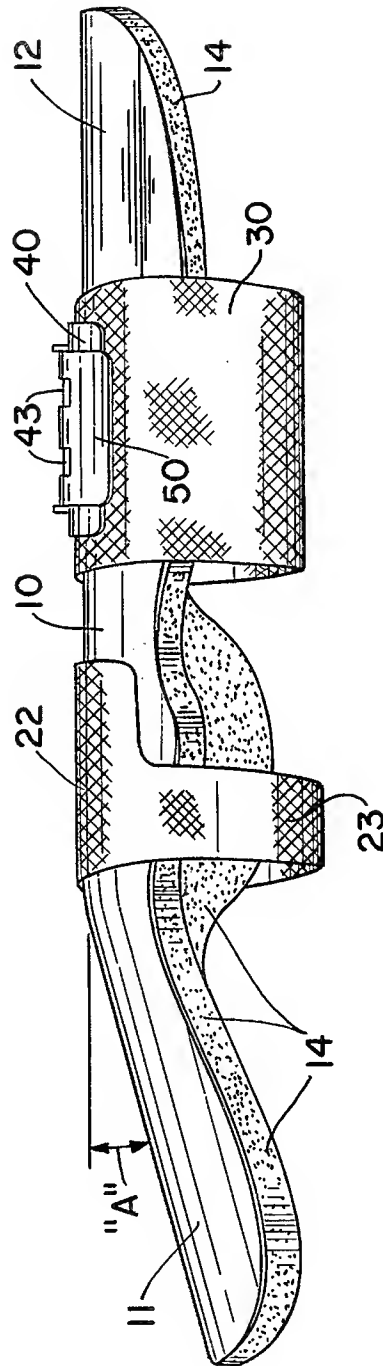




FIG. 3



## BOWLER'S WRIST AND FINGER CONTROL DEVICE

Our invention relates to apparatus for supporting the wrist and forefinger of a bowler in a desirable position.

### BACKGROUND OF THE INVENTION

A primary objective in bowling is that the bowler impart to the ball a combination of two rotary motions, called "roll" and "spin".

Most bowlers experience great difficulty in giving both these types of rotation to the ball simultaneously in any consistent manner.

Various solutions have been proposed for the problem described. Some devices have been designed which affect or control the position of the bowler's fingers. These include the devices of U.S. Pat. Nos. 3,038,723; 3,152,337; 3,224,012; 3,362,027; 3,563,545, and 3,595,575. These devices are not in common use and they are not effective to achieve the aims discussed.

Other devices have been proposed which control or limit the bending of the wrist. Examples are those disclosed in U.S. Pat. Nos. 1,469,315; 2,794,638; 2,924,458; 3,117,786; 3,235,258; 3,423,095; 3,512,776; 3,606,342; 3,704,994; 3,788,307; 3,829,090; 4,088,318 and 4,176,840. Such devices are sometimes partially effective in assisting with the so-called "lift" and resulting roll, but do not provide a consistent spin at the same time.

Other wrist supports have been designed which also control the middle fingers, but these, described in U.S. Pat. Nos. 3,467,379; 3,726,525; 3,770,270 and 3,880,426 are similarly ineffective.

Our experiments have revealed the presumed function of these and other devices as well as the reason why they fail to achieve the desired results. It is necessary to support and control both the wrist and the angle of the index finger, as will be seen below. Our invention, in providing both kinds of support, is effective in assisting the bowler to impart the desired combination of roll and spin to the ball in a consistent manner.

### SUMMARY OF THE INVENTION

An object of this invention is to provide a wrist and finger support which enables a bowler to give a desired combination of two types of rotary motion to the bowling ball.

A further object of this invention is to provide such a support which is adjustable to the dimensions of the individual user but which can be rapidly fitted to the user and removed.

These and other objects and advantages of our invention will become apparent from the following detailed description wherein reference is made to the figures in the accompanying drawings showing a preferred embodiment of the present invention, and illustrating the use thereof.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the wrist and finger support of our invention, in position on the arm of a user.

FIG. 2 is a plan view of our invention.

FIG. 3 is a side elevational view of our invention.

FIG. 4 is a perspective view of a bowling ball upon a bowling alley, engaged in the rotary motion called "roll".

FIG. 5 is a perspective view of a bowling ball upon a bowling alley, engaged in the rotary motion called "spin".

FIG. 6 is a perspective view of a bowler from the back.

FIG. 7 is another perspective view of a bowler from the back.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment of our invention is seen in FIGS. 1, 2 and 3. It comprises a support body 10, of any strong rigid material, such as aluminum having permanently fastened thereon a hand supporting strap 20, and having adjustably fastened thereupon, by threading through slots 13 in said support body 10 a wrist supporting strap 30.

The support body 10 is a flat plate constructed so as to curve in a generally cylindrical way around the axes of the forearm, wrist and forefinger of the user so that these body members are accommodated comfortably. At its distal end is a forefinger extension 11, which is proportioned to extend and partially encase over the dorsal surface of the user's forefinger along its entire length (see FIG. 1), and at its proximal end is a forearm extension 12 which is proportioned to extend over a portion of the dorsal surface of the user's forearm. The entire ventral surface of the support body 10 is covered with a resilient layer 14 of material such as sponge or foam rubber.

The cylindrical axis of curvature of forefinger extension 11 is preferably not parallel to the cylindrical axis of curvature of the support body 10 but is at a slight angle "A" to it, so that the user's forefinger is supported in a slightly bent position. We have found that for most users the optimal angle is approximately 15 to 20 degrees downward toward the palm; however, it is contemplated that for particular users the optimal angle may vary from 0 to 35 degrees, and it is within the scope of the present invention to provide by any standard hinge and lock arrangement, well known to those skilled in the art, for an adjustable angle between support body 10 and forefinger extension 11. Similarly, though the wrist should ordinarily be supported by our device with only a minimal forward bend of between 0 and 5 degrees, provision may be made for an adjustable joint at the wrist which locks the supported angle between the forearm and hand axes at any desired angle between 10 degrees upward, (backward) and 20 degrees downward (forward).

It may be desirable in some cases to provide the forefinger extension 11 with a slight upward bend on its distal end. This provides for the angle "A" to be maximized while still permitting the user's hand to be close enough to the ball to hold it.

Two slots 13 are provided in the support body 10. They are located so as to be directly over the wrist area of the user while the device is properly worn. The support body 10 bears a hinge 51 adjacent to the slots 13 by which is fastened a male buckle member 50. The male buckle member is permitted by hinge 51 to lie in its closed position over the support body 10 and wrist support strap 30. It is provided with two tabular slots 52 each of which is adjacent to an indent 53.

The wrist support strap 30 is composed of any strong flexible material such as nylon webbing. It is in the shape of a lengthwise band having a first end 31 and a second end 32. The first end 31 is threaded through slots

13 and left free, so that the ultimately effective length of wrist support strap 30 is adjustable. The second end 32 is threaded through a single buckle slot 41 located upon a female buckle member 40, and is permanently fastened to the wrist support strap 30, as by sewing so that the female buckle member 40 is permanently fastened to the wrist support strap 30. The female buckle member 40 contains an opening 42 therein of such dimensions as to permit the insertion therethrough of male buckle member 50. On one edge of the opening 42 and projecting generally toward the opening are two tabs 43, disposed to fit into the two tabular slots 52 when the male buckle member 50 is inserted into the female buckle member 40 and rotated by means of hinge 51 to its closed position.

The hand supporting strap 20 is composed of a material of characteristics similar to the wrist support strap 30. It has a first end portion 21 permanently fastened by any suitable means to the portion of the support body 10 which in use overlies essentially the entire dorsal surface of the user's hand. It has a second end portion located at a distance from the first end 21 approximately equal to the circumference of a typical hand, and a narrowed portion 23 intermediate the ends so that the hand supporting strap 20 may be wrapped comfortably around the hand with the second end portion 22 overlying the first end portion 21. The top surface of the first end portion 21 and the bottom surface of the second end portion 22 are preferably provided with corresponding Velcro\* tapes 24 and 25, respectively, so that the effective length of the hand supporting strap 20 is adjustable to the circumference of the user's hand.

\*Trademark

The method of using our invention will become apparent upon consideration of the general problems which it was designed to solve. First, the ball must be made to rotate in a forward and downward direction, i.e., along an axis which is horizontal and perpendicular to the direction of motion. This rotation, shown in FIG. 4, causes the ball to roll in the desired direction down the alley. Secondly, the ball should have a component of rotation (called "spin") along a vertical axis, counterclockwise as viewed from above (if thrown with the right hand). This "spin", shown in FIG. 5, is largely responsible for achieving a desired scattering of the pins as they fall.

Many students of the bowling art have recognized that the middle two fingers, which occupy adjacent holes in the ball, should be the source of the desired roll. These fingers should rotate the underside of the ball upward, an effect called "lift", as they leave the ball upon release. In order for this to occur in a smooth manner the bowler's thumb must come out of the ball first. But at the same time the hand should be turning the ball to impart spin. Bowlers commonly have had great difficulty in smoothly accomplishing these aims.

In approaching the release of the ball, the bowler's thumb should be maintained in a higher position than the middle fingers. The best position for the ball is therefore not directly below the hand, but partly beside it and to the inside (as in FIG. 5). The value of supporting the wrist can be seen by comparing FIG. 6 to FIG.

7, in which the wrist is bent backward by the weight of the ball. But a straight wrist is not enough. Our studies have shown that if the index finger is permitted to bend backward near the moment of release, the thumb cannot be extracted from the ball most efficiently, and moreover the hand lacks sufficient control to impart spin to the ball.

The solution which our invention makes possible is to control simultaneously both the straightness of the wrist and the angle of the index finger with respect to the hand. The supported index finger is thus enabled to partially support and balance the ball. Equally importantly, it acts as a fulcrum. The ball can be tilted easily at the desired moment off the index finger and onto the middle fingers thereby automatically both extracting the thumb and giving spin to the ball.

It will be apparent from the foregoing that many variations and modifications may be made in the device described herein without substantially departing from the essential concept of the present invention. Accordingly, it should be understood that the form of the invention described herein and depicted in the drawings, is exemplary only and is not intended as a limitation in the scope of the present invention.

We claim:

1. A wrist and forefinger support for a bowler, comprising

a rigid support body provided with a layer of resilient material between said support body and said bowler's hand, said rigid support body adapted to extend dorsally from said bowler's forefinger to a location on his forearm above his wrist, and having a proximal and a distal portion,

said distal portion extending over the entire length of said bowler's forefinger only, and being cylindrically curved concavely downward so that it curves generally around, and partially encases, the forefinger, said proximal portion having a hand covering portion covering said bowler's hand and a wrist covering portion covering his wrist, said hand covering portion being transversely widened to cover essentially the entire dorsal surface of the bowler's hand, including the area extending from the base of the little finger to the base of the forefinger, said proximal portion extending dorsally over a portion of said bowler's forearm, and curving cylindrically to fit generally around said hand, wrist and forearm;

strap means to secure said support body firmly but removably against said bowler's hand and wrist;

said support means and strap means being so constructed as to restrict the backwards movement of said bowler's hand to a range of from and including zero degrees, with respect to the axis of said bowler's forearm, up to five degrees forward, and being so constructed as to restrict the backwards movement of said bowler's forefinger to an optimal angular range of 15 to 20 degrees forward, with respect to the axis of said bowler's hand.

\* \* \* \* \*

